CLAIMS

I claim:

1. A method of obtaining uniform coupling onto a microwave nonreciprocal resonator showing a circular symmetry, comprising:

A) installing an outer feeder network consisting of an N-fold binary divider showing a circular symmetry coincident with that of said microwave nonreciprocal resonator, where N is a non-negative integer,

B) if $N > 0$, installing electronic switches of a predetermined type or types at predetermined position or positions distributed with said outer feeder network so that 2^N paths results,

C) installing an inner feeder network consisting of a radial branch rendering M branch arms of an equal electrical length and a common vertex coincident with the center of said microwave nonreciprocal resonator, where M is an integer no less than 1,

D) if $M > 1$, installing electronic switches of a predetermined type or types at predetermined position or positions distributed with said inner feeder network so that M paths results,

wherein by electrically coupling in/out said outer feeder network and said inner feeder network with said microwave nonreciprocal resonator, distinct electrical paths result, each of which is characterized by a unique phase with nominally the same insertion loss, thereby realizing said uniform coupling onto said microwave nonreciprocal resonator.

2. The method of Claim 1 wherein said microwave nonreciprocal resonator results from magnetic bias of a ferrite medium loaded with said microwave nonreciprocal resonator.

3. The method of Claim 1 wherein said microwave nonreciprocal resonator results

from phase-quadrature feeding at orthogonal positions activated by said electronic switches distributed with said outer feeder network.

4. The method of Claim 1 wherein said radial branch shows a circular symmetry coincident with that of said microwave nonreciprocal resonator.

5. The method of Claim 1 wherein said distinct electrical paths include $M \cdot 2^N$ paths.

6. A uniform coupling device to be installed with a nonreciprocal resonator showing a circular symmetry, comprising:

A) an outer feeder network consisting of an N-fold binary divider showing a circular symmetry coincident with that of said nonreciprocal resonator, where N is a non-negative integer,

B) an inner feeder network consisting of a radial branch rendering M branch arms of an equal electrical length and a common vertex coincident with the center of said nonreciprocal resonator, where M is an integer no less than 1,

C) electronic switches of a predetermined type or types at predetermined position or positions distributed with said outer feeder network, if $N > 0$, and said inner feeder network, if $M > 1$, to result 2^N paths and M paths, respectively;

wherein by electrically coupling in/out said outer feeder network and said inner feeder network with said nonreciprocal resonator, distinct overall electrical paths result, each of which is characterized by a unique phase with nominally the same insertion loss, thereby realizing the desired uniform coupling operation of said uniform coupling device.

7. The uniform coupling device of Claim 6 wherein said nonreciprocal resonator results from magnetic bias of a ferrite medium loaded with said microwave nonreciprocal resonator.

8. The uniform coupling device of Claim 6 wherein said nonreciprocal resonator results from phase-quadrature feeding at orthogonal positions activated by said electronic switches distributed with said outer feeder network.

9. The uniform coupling device of Claim 6 wherein said radial branch shows a circular symmetry coincident with that of said nonreciprocal resonator.

10. The uniform coupling device of Claim 6 wherein said distinct electrical paths include $M \cdot 2^N$ paths.

11. The uniform coupling device of Claim 6 wherein said nonreciprocal resonator shows the shape of a disk or a ring assuming the microstrip, stripline, or the other planar circuit geometries.

12. The uniform coupling device of Claim 6 wherein said inner feeder network assumes the microstrip, stripline, or the other planar circuit geometries, placed inside said nonreciprocal resonator showing the ring shape, or below/above said nonreciprocal resonator showing the disk shape.

13. The uniform coupling device of Claim 6 wherein said outer feeder network assumes the microstrip, stripline, or the other planar circuit geometries, placed outside said nonreciprocal resonator showing the ring shape or the disk shape.

14. The uniform coupling device of Claim 6 wherein electrically coupling in/out said outer feeder network and said inner feeder network with said nonreciprocal resonator means capacitive coupling, inductive coupling, and./or conductive coupling.

15. The uniform coupling device of Claim 6 wherein said electronic switches incorporate semiconductor diodes, transistors, ferrites, ferroelectrics, and/or

superconductors, activated via the application of an electric current, a voltage, a light, a temperature change, and/or a magnetic/electric field.

16. The uniform coupling device of Claim 6 wherein said M branch arms do not necessarily to intersect all at one point; they may join each other first individually before leading to said common vertex.

17. The uniform coupling device of Claim 6 wherein impedance transformers, amplifiers, and/or attenuators are included with said outer feeder network and/or said inner feeder network.

SEQUENCE LISTING

(Not Applicable)